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DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
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IN REPLY REFER TO
OPNAVINST 9010.324A
OP-03C

21 AUG 1984

OPNAV INSTRUCTION 9010.324A

Subj: APPROVED TOP LEVEL REQUIREMENTS (TLR) FOR AUXILIARY SURVEY SHIP (T-AGS 39)

Encl: (1) Auxiliary Survey Ship (T-AGS 39) Top Level Requirement

1. Purpose: To promulgate the approved Top Level Requirement for the Auxiliary Survey Ship (T-AGS 39).
2. Cancellation. OPNAVINST 9010.324.
3. Applicability. This Top Level Requirement is applicable to the Auxiliary Survey Ship (T-AGS 39) Class commencing with the FY 1985 Shipbuilding and Conversion Program.
4. Discussion. Changes to this Top Level Requirement must be kept to a minimum. Therefore, any change which would result in a costly and time consuming impact on the ship's construction schedule must be fully justified. Proposed changes to the military characteristics of this ship shall be submitted to the Chairman of the Ship Characteristics and Improvement Board for approval of the Chief of Naval Operations.

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Deputy Chief of Naval Operations
(Surface Warfare)

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OPNAVINST 9010.324A

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TOP LEVEL REQUIREMENTS
OCEAN SURVEY SHIP (T-AGS) (FBM)

Enclosure (1)

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TOP LEVEL REQUIREMENTS

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1. OVERVIEW

1.1 Objectives and Scope

a. This document specifies the Top Level Requirements (TLR) for an Ocean Survey Ship (T-AGS), procurement of which is planned for FY 85. Included are the ship's mission, operational requirement, major configuration constraint, the plan for use, the maintenance concepts, the supply support concepts and minimum operational standards.

b. The objective of the T-AGS Ship Acquisition Program is to acquire the ocean survey ships for gathering geophysical data.

c. The format of this TLR has been developed in accordance with the requirements of OPNAVINST 9010.300 (NOTAL). The TLR documents ship requirements as they are developed and refined throughout the design phases of a ship acquisition program. After this TLR is issued, serialized changes will be made to promulgate any further requirements.

1.2 Constraints

a. An Initial Operational Capability (IOC) of late FY 87 is desired. A cost target of \$262.0M was established for the two ships. Further program review and development of a budget quality estimate may change this figure.

b. The provisions of this TLR are to be regarded as specific requirements or constraints unless the direction is described as a goal with a stated range of flexibility.

c. If the provisions of this TLR cannot be met, the Chief of Naval Material will so advise the Chief of Naval Operations (OP-37) in order to permit timely adjustments to the program or to this TLR.

1.3 Design Guidance. The T-AGS' are to comply with all the applicable laws of the United States and the requirements of the regulatory bodies American Bureau of Shipping (ABS), United States Coast Guard (USCG), in force at the time of delivery. The ships shall be classified by ABS to (MALTESE CROSS) A1 E(CIRCLED) and MALTESE CROSS) AMS (MALTESE CROSS) ACCU. Compliance with the General Specifications for Ships of the U.S. Navy, NAVSHIPS Technical Manual, or other military requirements is not required except as noted herein.

2. MISSION STATEMENT

2.1 Mission. The mission of the Ocean Survey Ship (T-AGS) is to conduct ocean surveys and provide essential geophysical (bathymetric, gravity and geomagnetic) and other scientific data.

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2.2 Primary Tasks. To carry out the mission, the T-AGS shall be capable of performing the following tasks:

a. To conduct geophysical surveys under the technical direction of the Commander, U. S. Navy Oceanographic Office.

b. The T-AGS' shall perform normal seamanship and navigation tasks.

2.3 Secondary Tasks. No offensive or defensive capabilities are required. In time of war, the T-AGS (FBM) have no survey mission.

3. TOTAL SHIP REQUIREMENTS AND CHARACTERISTICS

3.1 Warfare Area Capabilities, Including C³. Command, Control and Communications facilities shall be adequate for ocean survey operations. Features of command ship control facilities shall be in accordance with the Electronics Requirements Plan (App. A) and include -

a. Bridge and control spaces arranged in accordance with the standard instrument arrangement of such stations for commercial vessels.

b. Pilot house and bridge wings out to ship's side, port and starboard. Port and starboard bridge wings will include gyro repeaters, rudder angle indicators and RPM indicators.

c. Manual and automatic steering control.

d. Satisfactory visibility from pilot house forward and from bridge wings forward and aft.

e. A primary gyro.

f. A general ship's announcing system is to be provided.

g. A dial telephone system is to be provided.

h. Receive only facsimile capability shall be provided.

3.2 Detectability. Not applicable.

3.3 Survivability, Including Passive Protection

a. No provision shall be made for survivability features except for water washdown and damage control surveillance in accordance with regulatory and Military Sealift Command (MSC) requirements.

b. Degaussing is not required.

c. Collective Protective System is not required.

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d. Use of flammable materials shall be minimized in construction and outfitting material.

e. Environmental Electromagnetic Effects (E³). All radiators and receptors of electromagnetic energy and related electronics on the T-AGS shall be designed and installed to ensure electromagnetic compatibility (EMC) and to avoid hazards to electromagnetic radiation to personnel (HERP) and fuels (HERF). Automated control systems shall not respond spuriously to electromagnetic interference (EMI) from radiating sources or to transients on power lines. Protection from electromagnetic pulse (EMP) should be considered in the design, with emphasis on exterior communications and automated control systems.

f. Safety Requirements. Criteria of MIL-STD-882A shall not apply to the T-AGS ships. The ships shall meet all applicable requirements of the regulatory bodies.

3.4 Mobility. Optimum seaworthiness and sustained operational speed of 20 knots are required. The ships shall carry sufficient fuel to steam for 34 days at the sustained speed with a 1500 nautical mile margin. Machinery automation shall be the maximum consistent with current commercial practice to allow unmanned operation.

3.5 Operating Environment. The T-AGS ships shall operate as required in unrestricted worldwide service, and perform their mission under a range of weather conditions from tropic to subarctic. No operations in ice without ice breaker support are required.

3.5.1 Temperature and Humidity. The T-AGS habitability areas shall comply with MSC environmental standards as stated in COMSCINST 9330.6C. The T-AGS mission and mission support areas shall be designed for a maximum external air temperature of 105 degrees Fahrenheit dry bulb, 87.5 degrees Fahrenheit wet bulb, and a sea water temperature of 95 degrees Fahrenheit. Heating/air conditioning for the Navigation Information Center, Oceanographic Plot Center, Magnetic/Gravity Room and Oceanographic Communication Center shall be designed to provide: 68-71 degrees Fahrenheit with humidity of 50% + 5% with outside humidity of 80%. Other payload compartments shall be designed to maintain 70-80 degree Fahrenheit dry bulb with humidity of 50% + 5%.

3.5.2 Wind and Sea Conditions

a. Mission operation of the T-AGS ships at a sustained survey speed of 20 knots for 85 percent of headings in seas up to 13 feet (Sea State 5) is required.

b. Operating trim must be maintained to plus or minus 2 feet.

c. Limits for roll of plus or minus 15 degrees maximum

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and pitch of plus or minus 7 degrees maximum must be achieved 90 percent of the time during survey operations.

3.6 Utilization and Operational Availability

3.6.1 Availability. The T-AGS ships shall be ready to get underway on 48 hours notice.

3.6.2 Readiness Condition. T-AGS manning shall be directed to peacetime transit consistent with MSC manning policy.

3.6.3 Ship Utilization. T-AGS ships will have a regularly scheduled deployment cycle consisting of a mission up to 34 days at sea at a constant speed of 20 knots, followed by a 6 to 7 day period in port. A 45 day biennial yard period with a mid-period 30 day yard period in intervening years is scheduled for maintenance.

3.6.4 Wartime Utilization. In time of war, the T-AGS (FBM) have no survey mission.

3.6.5 Peacetime Use. The mission of the T-AGS is to conduct ocean surveys.

3.6.6 Peacetime Speed and Time Profile. Each T-AGS will normally operate a minimum of nine survey missions per year.

3.7 Logistic Support

a. The T-AGS ships shall be capable of organizational level self-maintenance and limited emergency repair of hull structure and engineering casualties. Maintenance task areas include:

- (1) Limited repair of above-water hull structure.
- (2) Minor steering system and/or shafting repair.
- (3) Minor propulsion, auxiliaries and electrical repairs.

b. The T-AGS ships shall have the capability for control of fire, flooding and casualties, for water washdown countermeasures and for maintaining security and damage control surveillance in accordance with regulatory body requirements and MSC standards.

c. Replenishment at sea capability shall be in accordance with MSC standards for an ocean survey ship. No underway refueling capability is required. Daylight helicopter MEDEVAC capability is desired.

d. The maintenance and overhaul concept for the T-AGS shall be consistent with the MSC program plan with a biennial overhaul period of 45 days and a 30 day availability period in intervening years.

e. Peacetime Ship Maintenance and Overhaul Cycle. T-AGS

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ships shall have self-sufficiency for regular preventive maintenance.

f. Supply Support

(1) Each T-AGS ship shall carry consumables for her own use as follows:

Dry Stores	100 days
Frozen	90 days
Chilled	45 days
Medical	120 days

(2) Chilled stowage shall be convertible to frozen stowage.

(3) Separate stowage space shall be provided for MSC deck, engine and steward stores. A central storeroom shall be provided for COSAL storage.

(4) Separate stowage space shall be provided for oceanographic sponsor stores.

3.8 Manning and Habitability

3.8.1 Accommodations. T-AGS accommodations shall be in accordance with the following:

	Officers	CPO	Crew	Enlisted	Total
Ship, Civilian	13*	6	37**		56
Navy	3	3		26	32
Scientific	20				20
Total	36	9	37	26	108

* Includes two spare single rooms

** Includes two spare double rooms

3.8.2 Habitability Standards

a. T-AGS habitability shall comply, insofar as practical, with COMSCINST 9330.6C. Quarters and messing facilities for scientific and Navy personnel shall be comparable to those provided for the MSC personnel. The following shall be provided: lounges, physical conditioning room, barber shop, hospital ward and self service laundries.

b. Airborne noise requirements of MARAD shall be set as goals to be met.

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3.9 Flexibility for Change, Including Space and Weight Reservations. Service life margin of five percent of full load displacement and .5 foot of KG shall be provided.

4. SUBSYSTEM REQUIREMENTS AND CHARACTERISTICS

4.1 Structure. The following specific capabilities and characteristics are required:

- a. The ships must have a minimum mean operating draft of 28 feet 6 inches associated with no more than a 2 foot trim fore or aft.
- b. The ships must satisfy the stability requirements of the U. S. Coast Guard for oceanographic vessels.
- c. The ships shall have a hull shape to minimize hull noise, sea flow noise and bubble sweep down.
- d. A bulbous bow shall be considered in the design.

4.2 Propulsion System. The following specific capabilities and characteristics are required:

- a. The main propulsion engines shall be -
 - (1) Diesel;
 - (2) Of American manufacturer, and
 - (3) Capable of using heavy fuel equivalent to a viscosity of 3500 seconds (Redwood No. 1) at 100° F.
- b. Economy of operation shall be considered during the design.
- c. Waste heat will be utilized to the maximum extent practicable.
- d. The machinery space will be designed for unmanned operation.
- e. Halon 1301 firefighting system and AFFF bilge flooding shall be provided.

4.3 Electric Plant. The following specific capabilities and characteristics are required:

- a. The diesel ship service generators shall be of sufficient capacity and number so that in the event of the loss of one unit, the remaining units can carry the normal operating load.
- b. A power take-off (PTO) generator driven by the main engine shall be investigated to carry the normal operating electric load.

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c. The power provided to the mission equipment must meet the stability requirements of the mission sponsor.

d. An uninterruptable power supply shall be provided for only that sponsor's equipment which, upon power loss, significantly impacts resumption of operations when normal power is restored.

4.4 Command and Surveillance

a. An accurate full time positioning capability and an optimum arrangement of facilities, commensurate with the equipment for the collection and processing of hydrographic, oceanographic and acoustic data shall be provided.

b. The spaces listed below shall be provided and, where practical, are to be located contiguous to one another in the area of the ship which experiences the least motion in a sea way. (R)
Secure areas are to have limited and controlled access.

- (1) Plot Center.
- (2) Navigation Information Center.
- (3) ET Workshop.
- (4) Oceanographic Communications Center.
- (5) NAVOCEANO Communications Office.
- (6) CMS Vault.
- (7) Transmitter Room.
- (8) MINISINS Trunk.
- (9) Log/Sonar Transducer Trunks.
- (10) Projector Trunk.
- (11) Hydrophone Trunk.
- (12) Mail Room.
- (13) Regulated Power Supply Room.
- (14) Oceanographic Watch Station.
- (15) Oceanographic Conference Room.
- (16) Projector Room.

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- (17) Magnetics and Gravity Room.
- (18) Oceanographic Supply Center.
- (19) Shredder Room.
- (20) Work Center Lounge.
- (21) Electronics and Logistics Office.
- (22) UPS Battery Room.
- (23) Oceanographic Unit Commanding Officer Office.
- (24) Oceanographic Unit Office.
- (25) Storage, Within Mission Space.
- (26) OMP (Ocean Mission Projects) Office.
- (27) White Print Shop.
- (28) Technical Library.

c. The following specific capabilities and characteristics are required:

(1) Gravimeter equipment must be located within secure sponsor mission spaces. The gravimeter sensor(s) must be positioned on the roll center of rotation plus/minus five feet. The gravimeter sensor(s) may be positioned fore or aft of the pitch center of rotation such that pitch-induced motion will not subject the sensor(s) to accelerations in excess of 25 galls (CM/SEC/SEC) when the T-AGS operates through Sea State 5 (up to 13 foot seas).

(2) There are no requirements for diving equipment or diving personnel.

(3) Machinery generated, hull conducted noise shall not adversely affect shipboard sonar performance.

(4) A paper shredder capable of shredding myslar film is required.

(5) Port and Starboard XBT launchers are required.

R) (6) One winch shall be located on the stern for handling magnetometer equipment.

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4.5 Auxiliary Systems

a. The following specific capabilities and characteristics are required:

(1) The distilling capacity shall consist of a minimum of two units, each capable of providing in excess of 60 gallons per man per day in accordance with the accommodations. Stowage for not less than 120 gallons of potable water per accommodation shall be provided.

(2) A clean ballast system will be provided to maintain the minimum draft and maximum trim required. Dirty ballast will not be necessary in any loading condition. Liquid ballast operations shall avoid partially full tanks in the hydrophone area.

b. The T-AGS ships shall be capable of limiting the pollution emanating from the ships. A shipboard sewage system, including transfer systems and marine sanitation devices flow through type II, shall be installed. Oily waste separation equipment shall be provided. The shore side connection fitting of discharge hoses from both sewage and other systems shall be compatible with berthing pier connections at expected discharge points.

4.6 Outfit and Furnishings. Not applicable.

4.7 Armament. Not applicable.

4.8 Other. Not applicable.

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APPENDIX A

Ship Electronics Requirements Plan (Note 1)

1. Infrared Facilities - None
2. Transmitting/Transceiving Facilities
 - 2 2-30 MHz All Emissions (1 kw) (R)
 - 1 225-400 MHz Satellite Transceiver (Los Capability)
 - 1 115-156 MHz A3
 - 1 156-162 MHz F3 (25W) Transceiver (D)
 - 1 2-30 MHz A3h, A3j (150W) (D)
 - 1 1535-1645 MHz Inmarsat Satellite Transceiver
3. Receiving Facilities
 - 2 2-30 MHz All Emissions (R)
 - 1 225-400 MHz Satellite Broadcast (D)
 - 1 14-550 kHz A1, A2, A3, F1
 - 1 0.5-30 MHz A1, A2, A3, F1
4. Terminal Facilities
 - 1 "G" - SC Duplex AFTS RATT
 - 1 "N" - MC BCST AFTS RAT CHNLS 1-4, 9-12
 - 1 "VV" - SC Simplex AFTS/RFCs RATT (Non-secure)
 - 1 "Sa" - SC HF Secure Voice (Narrowband)
 - 1 "Sd" - UHF Satellite Secure Voice (Narrowband)
 - 1 "R" - UHF Secure Voice (Narrowband)
 - 1 Facsimile Recorder (Receive Only)
 - 1 "I" - TTY Tape Production System
5. Radar Facilities
 - 1 10 cm Surface Search Radar (16" Display)
 - 1 3 cm Surface Search Radar (16" Display)
 - 1 Collision Avoidance System
6. Sonar Facilities - 1 Echo Depth Sounder with Remote Indicator
7. Countermeasures Facilities - None
8. Navigational Facilities
 - 1 Loran "C"
 - 1 SATNAV
 - 1 Gyrocompass (Note 2)
 - 1 Doppler Speed Log with Remote Indicator

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9. Radiac Facilities - Allowance per OPNAVINST C9670.2B (NOTAL).
Include AN/PDR-65.

10. Remote Station Facilities

a. Pilot House (Note 3)

- 1 Control and Monitoring of HF Voice Channel
- 1 Radar Display/Control; 10 cm
- 1 Radar Display/Control; 3 cm
- 1 Collision Avoidance System Console
- 1 Echo Depth Sounder Indicator
- 1 Doppler Speed Log Indicator
- 1 Control and Monitoring of Bridge to Bridge Radio
- 1 Control and Monitoring of Plain/Cipher Voice Control
- 1 Inmarsat Voice Channel

b. Bridge Wings - 1 Control and Monitoring of Extension of
Pilot House Plain/Cipher Voice Channel (1 each port and starboard)

c. Open Conning Station - 1 Control and Monitoring of
Extension of Pilot House Plain/Cipher Voice Channel

d. Chart Room

- 1 Reception of 1 CW Channel
- 1 Control of Loran "C"
- 1 Control/Display of Echo Depth Sounder
- 1 Control/Display of Doppler Speed Log
- 1 Control of Radio Direction Finder
- 1 Control/Display of Facsimile
- 1 Control of SATNAV

e. Radio Room - 1 Control and Monitoring of All Voice/TTY
Channels

11. Meteorological Facilities

a. Mission Space

- 1 Wind Speed/Direction Indicator
- 1 Gyro Repeater
- 1 Display of Echo Depth Sounder
- 1 Display of Doppler Speed Log

12. Supplemental Facilities - None

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13. Special Facilities

2 Frequency Standard

1 NAVMACS (AN/SYQ-7(v)1)

MVSS

UHF DAMA

CSS

2 EPIRB

(R

1 Automatic Alarm Receiver (2182 kHz)

1 Digital Selective Caller

2 Lifeboat Radio

Note 1 - FCC approved commercial marine equipment shall be utilized to fulfill these requirements wherever possible.

Note 2 - Gyro Repeater - Peloruses shall be installed on Pilot House center line, port and starboard wings, and open conning station center line.

Note 3 - Pilot House shall be equipped with magnetic compass, wind speed and direction indicators, navigation light control panel, whistle control (Automatic Inland and Manual International) and quick acting watertight door status panel.